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## NOTE ON THE HABITS OF *FIERASFER AFFINIS*

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ON the 18th of June, 1906, at the Tortugas Laboratory of the Carnegie Institution I had the opportunity of watching an evicted *Fierasfer* in the act of returning to his lodging-place in a holothurian (*Stichopus mæbii*).

A record of this event, while perhaps not contributing anything new to science, will, it is hoped, be useful to teachers of zoölogy.

Perhaps as good a way as any of making this communication will be to narrate in order the series of events by which the knowledge came to the writer and at the same time to his associates in the laboratory, all of whom were interested witnesses.

The holothurian in question was found in a fish-trap and taken to the laboratory where it was placed in a large dish filled with sea water. Incidentally it may be remarked that the holothurian had been out of the water fully half an hour. It should also be stated that the holothurian was taken to the laboratory rather in response to the instinct of collecting than for the purpose of carrying on any experimental work.

The specimen was placed on my table and in the intervals of other work I placed various objects on it for the purpose of finding out whether it would get rid of them or not.

The holothurian was very contractile and varied in length from 150 millimeters, or less, up to the diameter of the dish, 300 millimeters.

It appeared to be indifferent to the presence of such objects as small glass dishes, allowing them to settle slowly into the yielding mass of its body wall. At length a finger-bowl, 115 millimeters

in diameter, was inverted over the animal, the edges resting on the dorsal side and about 30 millimeters from each end. Instead of making any effort to escape the animal retreated beneath the finger-bowl and at the expiration of 30 minutes had made no effort to escape.

At this point in the experiment, my patience proved inferior to that of the holothurian and I lifted the finger-bowl. When this was done a specimen of the interesting genus *Fierasfer*, which I have identified as *F. affinis*, was found. Evidently it had been driven to leave its host on account of the deficient supply of oxygen. The fish, which was nearly transparent, measured 124 millimeters in length, and was very slender, tapering almost uniformly from the head to the tip of the long and whip-like tail.

As soon as the finger-bowl was removed the fish began to swim

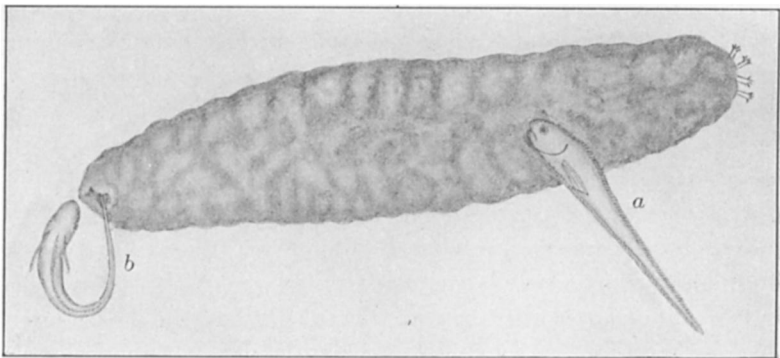


FIG. 1.— The figures represent the holothurian extended to the greatest length observed. All one-third natural size and diagrammatic.

- a. Position of fish during its progress toward the posterior end of its host.
- b. Fish at completion of movement which results in the insertion of the tail in the cloacal aperture.

actively about in the dish. It kept its nose close to the surface of the water, and at times even thrust its head above the surface in its eagerness to get oxygen.

After a few minutes it ceased to swim at the surface but appeared to be still uneasy. No test was made to prove what seemed to be indicated by its actions, *viz.*, that its sense of sight is defective. Judging from its subsequent behavior it was even then trying to find its customary quarters, but, to those of us who were watching, its movements began to be somewhat aimless.

At last, and, so far as I was able to judge, by accident, its nose came in contact with the holothurian near the anterior end. Immediately the fish appeared to become excited and began to feel its way back toward the posterior end of the holothurian. In its progress it bumped its nose rapidly against the side of the passive holothurian, and, as if following a scent, proceeded without any pause or regression toward the cloacal aperture. The instant that the nose of the fish touched the edge of the aperture, which was rather tightly closed, the slender tail was brought around with a very rapid whip-like movement, which terminated in a thrust whereby about 5 millimeters of the tip were darted into the narrow slit between the apposed lips of the cloaca. This movement was

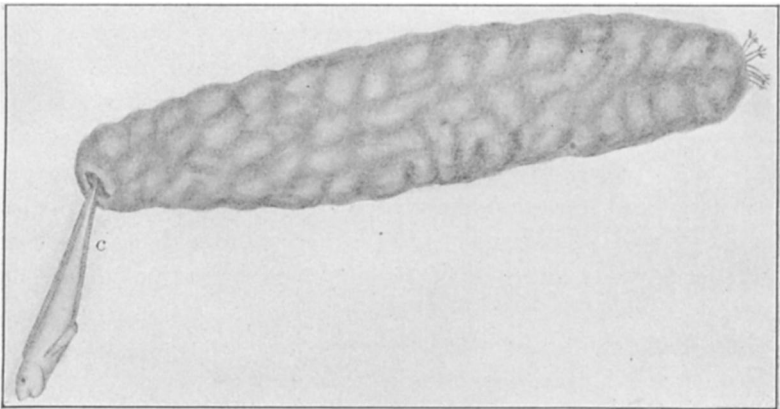


FIG. 2.—c. The fish has straightened and is beginning to insinuate itself into the body of its host.

effected while the nose of the fish was still touching the cloacal region.

Up to this time the fish had exhibited more or less excitement but as soon as the tip of its tail had been inserted it straightened itself and began leisurely to insinuate its body tail first into its host. In this process the fish appeared to be making some use of the spines of the dorsal and ventral fins. The motion was a slow, gliding one and was not dependent on the relaxing of the cloacal sphincter of the holothurian.

The lips of the cloacal aperture remained closed during the ingress except so far as they were forced apart by the body of the fish.

The time occupied by the fish in entering the holothurian was not taken, but in my notes which I made immediately after my observations, I find that I estimated the time to be probably not more than half a minute.

In order to give some of the workers in the laboratory, who had not seen all of the events described above, an opportunity to view this interesting instance of animal behavior, the experiment was repeated.

When the finger-bowl had been removed from the holothurian a second time the fish was found to be again in the water.

Then were repeated in minutest detail the actions which I have described above. The fish swam actively at the surface of the water—part of the time with its mouth above the surface. Then it began to move in a more or less aimless fashion. Finally it touched the holothurian with its nose, this time about the middle of the length. Then followed in exact order the reactions which had been observed before, *viz.*, the rapid bumping of its nose against the side of the holothurian, the undeviating progress towards the posterior end, the whip-like motion and insertion of the tail while the nose was still in contact with the margin of the cloacal aperture, the leisurely straightening of the body, and the gradual retreat into the resisting, at least not assisting, holothurian.

It should be added that the above account is made up from notes which I wrote down immediately after the observations were made. Except in one or two details they are confirmed by Dr. Ulric Dahlgren who has kindly placed his notes at my disposal.

The above account is the story of the way one *Fierasfer* gained entrance to its host. Whether every individual *Fierasfer* would behave exactly the same, under similar circumstances, perhaps does not necessarily follow.

I am indebted to Professor Cornelia M. Clapp for reference to an excellent article on the habits, anatomy, etc., of *Fierasfer* by Dr. Carlo Emery, (*Fauna und Flora des Golfes von Neapel*, vol. 1, 1880). Dr. Emery notes that *Fierasfer* enters its host tail first.

A somewhat similar habit is indicated for the common eel by what the veteran and accurate observer, Vinal N. Edwards, tells me, *viz.*, that eels go into holes tail first.